

Appl. No. 10/711,065
Amdt. dated August 22, 2005
Reply to Office action of June 23, 2005

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1-10 (cancelled).

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11 (currently amended): A light source testing method comprising:

- (a) providing a light source for generating light;
- (b) using an image capturing apparatus for capturing an image with a plurality of pixels according to the light, the image having an image center and an image edge at a distance of D1 from the image center; and
- ~~(c) using an image processing apparatus for calculating a plurality of gray levels corresponding to the plurality of pixels, and a characteristic parameter according to the plurality of gray levels.~~

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selecting a predetermined gray level G and defining a brightest area and the light source center as follows:

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the brightest area being an area formed by pixels with gray level larger than the predetermined gray level G from the plurality of pixels of the image;

the light source center being the center of the brightest area;

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defining the distance between the light source center c and the image center b as D2 to calculate the center deviation D2/D1;

calculating the area Q' of the brightest area;

calculating a maximum gray level GX of the plurality of pixels of the image, and a gray level difference $h' = GX - G$ between the predetermined gray level

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G and the maximum gray level GX;

calculating a product $V' = h' * Q'$ of the gray level difference h' and the area Q' ;

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calculating a plurality of rectangles surrounding the brightest area with their
four sides in contact with the brightest area;
selecting a specific rectangle having a minimum area among the plurality of
rectangles, and defining the shorter side of the selected rectangle as X, the
longer side as Y;
defining the ratio of side R1, the ratio of area R2, and the S value corresponding
to the shape of the light source to detect the uniformity of the light source
as follows:
$$R1=X/Y;$$
$$R2=(Q3/(X*Y));$$
$$S=R1*R2;$$
calculating the average gray level I according to the plurality of gray levels of
the plurality of pixels; and
evaluating the brightness and uniformity of the light source by calculating a P
value as follows:
$$P=(1-D2/D1)*V'*S*I.$$

12-17 (cancelled).

18 (currently amended): The method of ~~claim 17~~ claim 11 wherein the smaller the center deviation D2/D1 is, the larger the P value is, and the more uniform the light source is.

19 (currently amended): The method of ~~claim 17~~ claim 11 wherein the closer to 1 the S value is, the larger the P value is, and the more uniform the light source is.

20 (currently amended): The method of ~~claim 17~~ claim 11 wherein the larger V' or I is, the larger the P value is, and the brighter the light source is.

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21 (new): A light source testing method comprising:

providing a light source for generating light;

using an image capturing apparatus for capturing an image with a plurality of
5 pixels according to the light;

selecting a first predetermined gray level G1, and defining a first light source
testing area and a light source center c as follows:

the first light source testing area being an area formed by pixels with
gray level larger than the first predetermined gray level G1 from a
10 plurality of pixels of the image;

the light source center c being the center of the first light source testing
area; and

defining the distance between the light source center c and the image center b as
D2 to calculate a center deviation $D2/D1$ in order to detect the uniformity
15 of the light source.

22 (new): A light source testing method comprising:

providing a light source for generating light;

using an image capturing apparatus for capturing an image with a plurality of
20 pixels according to the light;

selecting a second predetermined gray level G2, and calculating the area Q2 of a
second light source testing area formed by pixels with gray level larger
than the second predetermined gray level G2 of the image;

calculating a maximum gray level GX1, and a gray level difference $h = GX1 - G2$
25 between the second predetermined gray level G2 and the maximum gray
level GX1; and

detecting the brightness of the light source by a product $V = h * Q2$ of the gray
level difference h and the area Q2.

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23 (new): A light source testing method comprising:

providing a light source for generating light;

using an image capturing apparatus for capturing an image with a plurality of

5 pixels according to the light;

selecting a third predetermined gray level G3, and defining the area Q3 of a
third light source testing area formed by pixels with gray level larger than
the third predetermined gray level G3 of the image;

10 calculating a plurality of rectangles surrounding the third light source testing
area with their four sides in contact with the third light source testing area;

selecting a specific rectangle having a minimum area among the plurality of
rectangles, and defining the shorter side of the selected rectangle as X, the
longer side as Y; and

15 defining a ratio of side R1, a ratio of area R2, and an S value corresponding to
the shape of the light source to detect the uniformity of the light source as
follows:

$$R1=X/Y;$$

$$R2=(Q3/(X*Y));$$

$$S=R1*R2.$$

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